Combat Vehicle Conference

BG David Ogg
13 Oct 2009
Program Executive Office Ground Combat Systems

**Vision:**
“Be the premier Acquisition Organization by equipping Joint and Allied Forces with unparalleled lethal and survivable Ground Combat Systems”

**Mission:**
"Lead the Army's Ground Combat System Programs by providing the Joint Warfighter with mission capable systems as part of a full-spectrum force, through sound life cycle management"

- **Stryker Brigade Combat Team**
  - Stryker Family of 10 vehicles

- **Heavy Brigade Combat Team**
  - Abrams Tank
  - M88 Recovery Vehicle
  - Bradley Fighting Vehicle
  - Paladin / FAASV
  - M113
  - Knight

- **Joint Robotic Systems**
  - X-bot
  - MV-4
  - TALON
  - MARCbot

- **Joint LW Howitzer 155mm**
  - (Army & Marine)
  - M777A2
  - M119A2
  - M198
  - M111 IPADS
PEO GCS Portfolio

Robotic Systems JPO
- UA Ground Systems
- Engineer Talon
- Gladiator
- MARCbot
- Packbot
- Assault Breacher Vehicle
- MV-4 Flail

HBCT
- Abrams Tank
- M88 Recovery Vehicle
- Bradley Fighting Vehicle FOV
- M113 FOV
- Paladin 155mm SP Howitzer/FAASV
- Armored/M707 Knight

JLW 155 System
- Lightweight 155mm Towed Howitzer
- 105mm Towed Howitzer
- Improved Position & Azimuth Determining System - IPADS
- 155mm Medium Towed Howitzer
- Gun Laying and Positioning System

Stryker Brigade Combat Team
- Mobile Gun System
- Infantry Carrier Vehicle
- Medical Evacuation Vehicle
- Reconnaissance Vehicle
- Commander’s Vehicle
- Engineer Squad Vehicle
- NBC Reconnaissance Vehicle
- Mortar Carrier
- Anti-tank Guided Missile
- Fire Support Vehicle

Our Mission is Our Warfighters’ Future
Supporting OCO & ARFORGEN

In The Fight Today
- 410 Abrams
- 700 Bradleys
- 175 Fire Spt Platforms
- 645 Strykers
- 6000 Robots
- 150 JLW Howitzers

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.
PEO GCS Modernization Tenets

Facing Common Upgrade Challenges
- Exceeding Weight Limits
- Exceeding Development Costs
- O&S Cost Increasing
- Additional Capability
- Power Availability
- Capability Needs

Opportunity for Common solutions
- Minimizing Development Costs
- Commonized Capability Across Fleets
- O&S Cost Benefits
- Increased quantities yielding procurement cost saving

Modernization Synchronized With ARFORGEN
- RESET & Train
- UPGRADE & Train

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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.
PEO GCS Modernization Approach

• Systems Engineering Approach within a Fleet Context
• Coordination/Synchronization with other PEOs
  – Interface development
  – Acquisition Strategy and Programmatics
• Buy Back SWAP-C
• Ensure Sufficient Power, Energy, and Vehicle Electronics Backbone to support Army Modernization
  – Battle Command and Transport Layer
  – Mission Equipment Packages
  – Vehicle Health Management and Embedded Training
• Commonality Across the Fleet
  – Component Level where Possible
  – Architecture level
• Open Systems Architecture
PM Heavy Brigade Combat Team
(HBCT)

Paul R. Lepine
Colonel, Field Artillery
Project Manager
Heavy Brigade Combat Team

PM Abrams

PM Bradley / M113

PM Fire Support Platforms

PD Mounted Maneuver Foreign Military Sales

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Heavy Brigade Combat Team

**PM Abrams**
- M1A2 SEP (1547)
- M1A1 SA (958)
- M88A1 (1035)
- M88A2 (607)
- M104 (44)

**PM Bradley / M113**
- M2/3A2 (2082)
- M2/3A3 (2479)
- M113A3 (3515)
- M1064A3 (825)
- M577A3 (1978)
- M1068A3 (1010)

**PM Fire Support Platforms**
- M109A6 (854)
- M992A2 (804)
- M3A3 BFISt (258)
- M7 BFISt (158)
- M1200 (490)

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10/13/2009
PM HBCT FMS Cases
Active and Pending

Greece
48 M577 A2

Iraq
280 M1A1
16 M88 A2
50 M113 A2

Morocco
200 M1A1
20 M88 A1
60 M109 A5
36 M577 A2

Columbia
880 M1A1
10 M88 A2

Egypt
1005 M1A1
87 M88 A2
400 M2A2 ODS
200 M109 A5
12 M113 A2
26 M577 A2
41 M548 A1

Lebanon
41 M198

Jordan
100 M2A2 ODS
1000 M113 A2

Saudi Arabia
315 M1A2
59 M1A2S*
47 M88 A1
48 M109 A5

Bahrain
35 M1A1
100 M113 A2
13 M1064

Pakistan
115 M109 A5
550 M113 A2

Kuwait
218 M1A2
14 M88 A2
16 M113 Ambulances
30 M577 A3 CPV

Australia
59 M1A1 SA
7 M88 A2
57 M777 A2

*awaiting conversion

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Abrams Projected Improvements

**Lethality**
- Improved Combat Identification
- Improved Accuracy
- Improved Target Recognition
- Improved Ammo

**Survivability**
- Improved Fire Suppression System
- Improved Ballistic Protection
- Improved Situational Awareness

**Sustainment**
- More Reliable Power Train
- More Reliable Track and Road-wheels
- Embedded Vehicle Health Management System
- Improved Silent Watch

Develop an Integrated Fighting System that Will Overmatch Future Threats Across the Full Spectrum Warfare
Bradley Projected Improvements

- Increased Lethality
  - Commander Self Defense Weapon
  - Combat Identification
- Target Designation
  - Aided Target Recognition
- Improved Ammo
- IED Electronic Counter Measures
- JTRS/FCS Spinouts Signature Management
- Improved IED Survivability
- Improved Crew and Soldier Protection
- Improved Rear Ballistic Protection
- External Fire Suppression
- Overhead Wire Protection Spotlight
- Active Protection Threat Warning System
- Improved Vehicle Health MGT & Embedded Electronic Technical Manuals
- Environmental Conditioning
- Improved Mobility
- Rearward and Side Looking Vision Systems

Develop an Integrated Fighting System that Will Complement Across the Full Spectrum Warfare

Our Mission is Our Warfighters’ Future

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Fire Support Platforms Priorities

- PIM
- RESET the BFIST, M109 FOV, and Knight
- SYNC with ARFORGEN/ARI Alignment
- Modularity
- CREW Integration
- Software Blocking
- VHMS Strategy
- Modernization

**M109 FOV**
(Sustainment)
PDFCS Fielding and Excalibur Integration

**BFIST**
FS3 Integration on A3 BFIST

**KNIGHT**
Execute the Armored Knight

Acquisition Strategy to Field 531 Systems Targeting Under Armor and on the Move

- M7 Upgrade to Bradley ODS-SA Configuration

Our #1 Priority is to Support Units Engaged in Overseas Contingency Operation (OCO) and those Units Preparing to Deploy

Our Mission is Our Warfighters' Future

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Paladin/FAASV
Integrated Management (PIM)

• Program Objectives
  – Replace Obsolete Components
  – Ensure Long Term Sustainment
  – Reduce Log Footprint
  – Reduce Operations & Support Costs
  – Regain Mobility

• Maintain a 10-12 yr Fleet Age
  – Improvements to power train, power management, rammer, slip ring, hydraulics, suspension and fire control
  – New chassis for Paladin and FAASV
  – Crew Survivability

• Vehicle Health Management System (VHMS),
• Common Modular Power System (CMPS)

• Address Obsolescence and Sustainment Issues
  – Leverage Bradley Fleet Commonality
  – Bradley Engine/Transmission/Final Drives/Track/Suspension
  – NLOS-C Electric Drive and Rammer

Lethality
Sustainment
Survivability
Robotic Systems Joint Project Office (RS JPO)

David C. Thompson
LtCol, USMC
Project Manager
Robotic Systems Portfolio

**Maneuver**
- IED Defeat Systems
- Disarm / Disrupt
- Reconnaissance
- Investigation
- Explosive Sniffer

**Maneuver Support**
- Area/Route Clearance
- Mine Neutralization
- Counter IED
- CBRNE

**Sustainment**
- Common Robotic Kit
- EOD
- Convoy
- Log/Resupply
RS JPO Joint Robotic Repair and Fielding Activities in OIF/OEF

Iraq
- 13 Soldiers/Marines
- 8 civilians
- 1700+ robots

Afghanistan
- 11 Soldiers/Marines
- 1 civilian
- 800+ robots
Material Enterprise Challenges & Opportunities

- Establish a concerted materiel enterprise strategy that balances both current and future requirements
- Deliver fully integrated ALT capabilities to the Joint Warfighter
  - AMC empowered RS JPO with theater sustainment of ground robots: Joint Robotic Repair and Fielding Activity
  - Partnered with RDECOM and other Service labs for appropriate technical expertise (ie. TARDEC for vehicle integration, ARDEC for weapons)
- Must account for the sustainment and modernization of the current force, spinouts and other technology transfers to the current force and BCTs
- Two add'l issue/challenges:
  - No centralized robotics strategy/disparate pots of resources
  - Configuration Management – multiple organizations “touch” robots
Robotic Modernization

**Equipment**
- 55 lbs: Arm Strength
- 90 lbs: Dexterity

**Logistics**
- RSTA: Endurance Power/Energy
- CBRNE Detection
- Maneuver
- Route Clearance/Engineering
- IED

**2004 Capability**
- Tele-op
- Dedicated OCU
- Improved Communications for: standoff range, crew compatibility

**2010 Capability**
- Supervised Autonomy
- Interoperability

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Family of Robotic Systems
Payload Integration and Interoperability

Common payload interface across platforms by mission or class

Family of unmanned ground systems

MISSION EQUIPMENT PAYLOADS

Payload A  Payload B  Payload C  Payload D  Payload E

Payload Interface Standard Architecture
PM Stryker Brigade Combat Team (SBCT)

Robert W. Schumitz
Colonel, IN
Project Manager
Stryker Brigade Combat Team
(Family of Vehicles)

Heavy Brigade
Combat Team
PM COL P. Lepine
DPM Mr. K. Houser

Stryker Brigade
Combat Team
PM COL R. Schumitz
DPM Ms. C. Tucker

Lightweight
155MM Howitzer
PM Mr. J. Shields
DPM Mr. K. Gooding

Robotic
Systems JPO
PM LtCol D. Thompson (USMC)
DPM Mr. J. Jaczkowski

NBCRV
ATGM
MEV
ESV
FSV
ICV
RV
MGS
MCV
CV
Stryker Family of Vehicles

Commonality
Common Operating Picture
Common Chassis & Drive Train
Common KPP’s
Common Survivability
Common TMDE, Spare Parts, Tools & Skills

Bottom Line
Stryker provides enhanced, Battle-proven capabilities to warfighters
Over 25 million miles in Combat Currently on 11th SBCT Deployment

Infantry Carrier Vehicle (ICV) - 130
NBC Reconnaissance Vehicle (NBCRV) - 3
Anti Tank Guided Missile (ATGM) - 10
Medical Evacuation Vehicle (MEV) - 16
Engineer Squad Vehicle (ESV) - 13
Fire Support Vehicle (FSV) - 14
120mm Mounted Mortar Carrier (MCV) - 37
Commander’s Vehicle (CV) - 28

Reconnaissance Vehicle (RV) - 52
Mobile Gun System (MGS) - 29

10/13/2009
**Deployment History and Future**

**CY2003 – CY2010**

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<td>OIF</td>
<td>Nov 03 - Oct 04</td>
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<td>Sep 04 - Oct 05</td>
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<td>3.3 M</td>
<td>3.1 M</td>
<td>3.8 M</td>
<td>4.4 M</td>
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<td>Average Number of Stryker Vehicles</td>
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<td>495</td>
<td>825</td>
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<td>Average Number of Soldiers in Stryker Vehicles</td>
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Stryker FoV Modernization History

Jul 09

May-July 09
SMOD Concept/Requirement Trades PM & TCM

MGS Long Term mitigation deficiencies tied to Stryker MOD; Go forward to Stryker MOD IPR

Apr 09
SMOD Trade Study Concept

• Subsystems/Integration Concepts with 1.2 billion possible combinations
• TRL 6 or higher
• SE Process yields best concept

May 09
VCSA MGS Brief

May 08
Army Stopped SPIP but continue analysis

Feb 08
MGS DAB

DAE provides S-PIP authority to fund $10M for:
- Mod/Sim
- Spec Development
- Independent BCA
- Requirements Validation

May 08
MGS CSB

Dec 08
MGS CSB

DoDI 5000.02
Updated – TDS impact

• Correct MGS Deficiencies
• Convene an MGS CSB
• Authority to produce 62 MGS Vehicles

Sep 08
DAE Update

Aug 08
MGS ADM

• Support to fund an additional $67M required for Long-Term MGS deficiency mitigation efforts tied to Stryker Modernization for FoV
• DAE Tasked - Update TDS/TES and return in 60 days for MS A Credit

Nov 07
PM SBCT CSB

Jan 08 – AAE recommends authorization of FY 08/09 RDT&E funds to conduct Pre-MS B activities

Jun 08
SMOD Concept/Requirement Trades PM & TCM

TDS in Army Staffing & TES in OSD Staffing

• Added three requirements from proponent to the ADM deficiency mitigation efforts

Jun 08
SMOD Concept/Requirement Trades PM & TCM

MGS Long Term mitigation deficiencies tied to Stryker MOD; Go forward to Stryker MOD IPR

YIELDERS OF BEST CONCEPT

SE Process yields best concept

MGS Long Term mitigation deficiencies tied to Stryker MOD; Go forward to Stryker MOD IPR

SE Process yields best concept

SE Process yields best concept

SE Process yields best concept

SE Process yields best concept

SE Process yields best concept
Stryker Constraints

**SPACE**
- Multiple Appliqué solutions added “Scaleable / Kitable Concept” limited
- Kits create both interior & exterior challenges for each carrier variant
  - CREW, GSS/MSS, Armor Upgrades
  - Additional displays/screens
  - 2nd/3rd order effects include weight and power
- Egress

**WEIGHT**
- Kits required to address threats
  - IED, RPG, EFP, Sniper, etc
- Only select Kits can be applied
- Deployed configuration weighs more than planned
  - ICV by ~11,000 lbs
  - MGS by ~9,000 lbs
- Safety Speed limits apply over 41,000 lbs

**POWER**
- OIF kit loads require some systems to be turned off
- Current Power Generation cannot meet expected future loads
- Silent watch capability impacted
- Excess heat impacts both onboard electronics and Soldiers effectiveness

*Current Space, Power and Suspension Capacity Shortfalls require Plans for Future Growth*
Balancing Capabilities Stryker Modernization (S-Mod) Systems Engineering Process

Comprehensive System Design results in Balanced Technical Approach

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Backup Slides
The M1200 Armored Knight provides Combat Observation Lasing Teams (Colts) with a highly survivable platform for the battlefield.

Targeting Under Armor/On the Move effort underway to increase survivability of targeting station operator and lethality of self-defense weapon.

Ongoing ECP’s/MWOs address increased survivability.

135 – Armored Knights fielded through September 2009.

Modularity End State is 490.
BFIST Program Overview

- **Targeting Under Armor/On the Move effort underway to increase survivability of targeting station operator and lethality of self-defense weapon**

  - **BFIST SA Project**
    - Modified to align with the Bradley ODS-SA Project
    - Vehicle will be similar to an A3 BFIST without the CIV

  - **Bradley Urban Survivability Kits II (BUSK II) applicable to BFIST**
    - New FSSO seat testing accomplished successfully Jun 09
    - Chillers scheduled for delivery to AO Dec 09

  - **Bradley BFIST Desktop Trainers (BBDT)**
    - Changes to improve the soldier’s training experience are being finalized for delivery Sep 09.

- **FS3 integration on A3 BFIST**
  - Government testing started Jun 09
  - Limited User Testing scheduled Jan-Feb 2010

- **Under Bradley Reman and Reset, Fielding of BFIST vehicles continue to meet ARFORGEN**
  - Support to Bradley reliability improvements to quickly correct Mission Critical failures
  - System / MEP obsolescence and upgrade efforts cut into production and fielding

- **3310/13/2009**

Our Mission is Our Warfighters’ Future
Heavy Brigade Combat Team Formation

19 Active Component
7 Reserve Component
3 Army Prepositioned Stock
2 Equipping Force Pool

31 Total HBCTs